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TECHNICAL NOTE

U.S. DEPARTMENT OF THE INTERIOR – BUREAU OF LAND MANAGEMENT

DETERMINING RECOVERY POTENTIAL

OF

BURNED PLANTS FOLLOWING RANGE FIRE

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Introduction

Burned areas resulting from wildfires on Bureau-administered lands are examined to determine the need for rehabilitation. The emergency nature of necessary treatment often requires completion of the evaluation and analysis within a short time. Management of grazing is given first consideration as a method of re-establishing desired vegetation. The additional need for seeding is largely dependent upon the estimated period of time required to obtain cover without seeding. This is influenced by composition of the original cover and the damage that has occurred to it (1) 1/.

The fire rehabilitation workshop at Boise in 1972 recognized as a problem the "Development of criteria to determine the need for emergency rehabilitation". The work group which identified problems related to wildlife and environmental protection placed high priority on its recommendation that "More information or criteria is needed so we can determine whether the plants of a burned area are dead or alive" (2).

The need has been recognized for guidance to more objectively evaluate range recovery potential. The technique described here is one additional tool for use in making such decisions.

Tetrazolium

Tetrazolium (2, 3, 5 - Triphenyl-2H-tetrazolium chloride), usually abbreviated as TZ, is largely used in the United States as a rapid method of testing the potential viability and vigor of seeds (3). Seed testing laboratories find the TZ test especially useful in evaluating seeds that otherwise require long or undetermined testing periods--as for example, those of many woody plants. Prepared seeds are soaked in a 1.0% solution of the white powder. In living cells, the colorless TZ is reduced by enzyme action to form a stable, red compound which is

1/ Numbers in parentheses refer to literature cited.

insoluble in water. Depth of color normally is an indicator of the vigor of the tested tissue. Dead tissues remain unstained (4, 5). TZ is available from biochemical supply firms at a cost of approximately \$25.00 for 50 grams. To prepare a 1.0% solution, dissolve 1 gram of TZ powder in 100 ml. distilled or tap water. Care must be taken to not expose solution to light for extended periods or the solution will turn a pink color. Both the powder and the stock solution can be kept indefinitely as long as it is stored in amber containers or not exposed to light. Caution, once the stock solution is used, re-use is not recommended because contamination occurs during use.

Evaluating Burned Plants

TZ can be used to detect live tissue in badly burned plants following rangeland fire. Culm bases of perennial grasses, for example, can easily be field tested with results becoming evident within a few hours. A simple procedure that has worked satisfactorily is as follows:

Collect the sample. A one-inch section taken from the basal (growing point) area is sufficient.

Clean away excess chaff. Coarse stems may be slit. The TZ must contact living material to produce the reaction.

Place sample in suitable container (15-20 cc. glass or plastic vials are satisfactory for field use).

Cover sample with TZ.

Stopper and label. Place in the dark.

Color change of vigorous, live tissue may become apparent within a few hours. There is no need to wait longer than overnight before examining samples even of woody tissue exposed to TZ. Warm temperatures (e.g. 26°C.) speeds action. Remove tissue from solution and examine under a low-power lens. ANY pink color indicates SOME life. Much active respiration produces deeper red color. Further experience is needed with various species to improve accuracy of recovery predictions in local situations.

Testing Seeds

Seeds found on or in the soil can be tested for viability whether following fire, or in seedings where germination failures occur, as well as the usual sampling of bulk seed. Seed testing procedural details vary with species and the technique is best conducted by experienced analysts.

In general, the seed sample is presoaked in water to soften for approximately 5 or 6 hours, then drained and the seed coats removed or the seed cut transversely avoiding the embryo. The prepared seeds are then placed in a one percent water solution of TZ sufficient to cover. Evaluation is made as described above.

Literature

- (1) BLM Manual 7240.
- (2) USDI Bureau of Land Management. 1972. Fire rehabilitation critique and workshop Proc. Boise. Feb. 15-17.
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- (4) USDA. 1961. Tests for germination in the laboratory. P. 433-443. In Seeds. U. S. Dept. Agr. Yearbook.
- (5) USDA Forest Service. 1974. Seeds of woody plants in the United States. Agri. Handbook 450. P. 147.

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